Learning About Los Alamos

University of California scientific expertise has served the nation and the world for more than 60 years. At the dawn of the Manhattan Project at Los Alamos, N.M., in the 1940s, the university assembled the brightest minds in the world to help bring about the end of World War II. Since then, the world-class scientists at Los Alamos National Laboratory have continued to apply their renowned expertise and creativity to solving problems of national importance in such areas as defense, energy, health and the environment.

Today, the University of California manages Los Alamos under the National Nuclear Security Administration of the U.S. Department of Energy. Los Alamos' vast research complex comprises more than 50 cross-disciplinary user facilities in an environment that encourages academic freedom and collaboration and stimulates world-class scientific achievement.

The laboratory, 35 miles northwest of Santa Fe, covers nearly 40 square miles with 47 technical areas and more than 2,100 individual facilities. With an annual budget of more than $2 billion, Los Alamos National Laboratory is one of the world's largest multi-disciplinary institutions and is one of the largest employers in Northern New Mexico with more than 8,000 University of California employees and 3,000-plus contract personnel. Additionally, more than 1,800 students work and conduct research there.

The laboratory has more than 300 industrial partnerships with a combined value over the past decade in excess of $650 million. Laboratory industrial partnerships bolster the economy and increase U.S. competitiveness in the global marketplace.

Los Alamos National Laboratory enhances global security by working in partnership with its sister laboratories to:

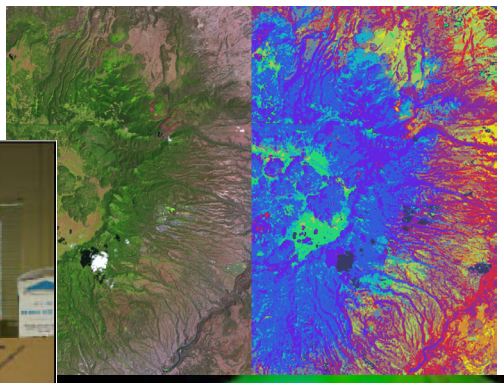
- Ensure the safety and reliability of the U.S. nuclear deterrent;
- Develop and apply technologies to reduce the threat of weapons of mass destruction; and,
- Solve national problems in defense, energy, environment and infrastructure.

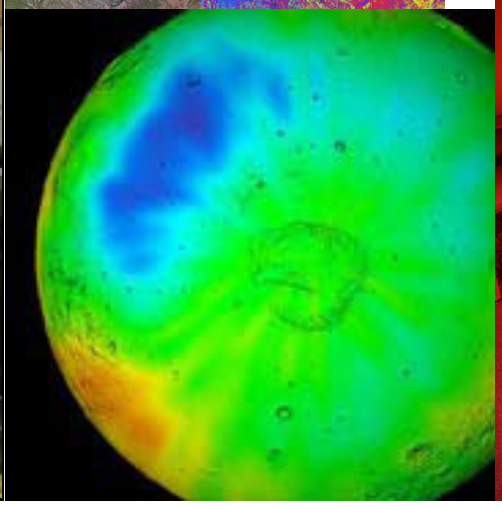
Meeting scientific challenges

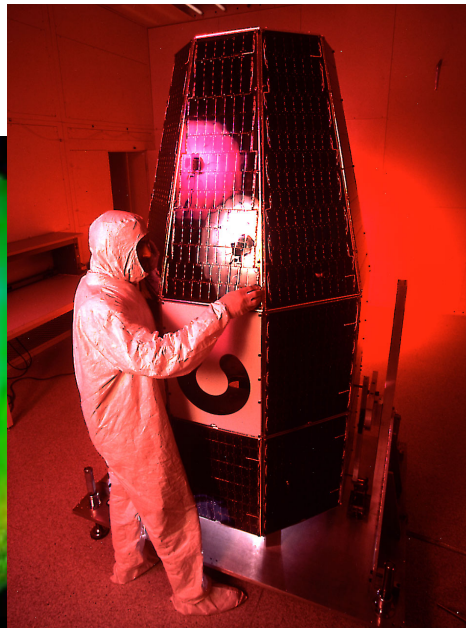
As the nation faces challenges to its national security at home and abroad, Los Alamos and the other national laboratories are at the forefront of making scientific contributions that meet the challenges of today's world.

Well known for research and discoveries in the field of atomic energy, the efforts by scientists at Los Alamos go beyond that core capability to include:

- Building, deploying and analyzing the data from the neutron spectrometers aboard NASA's mars Odyssey spacecraft to map potential water on mars.
- Developing the first practical superconducting tapes that will lead to far more efficient electric power distribution systems, motors and other electrical devices.
- Originating the first experimental proof of the existence of the neutrino, a discovery that led to a Nobel Prize in 1995; and the first experimental evidence of neutrino mass, which could help explain the makeup of the universe.



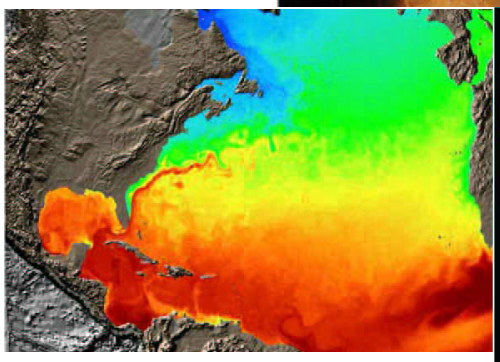


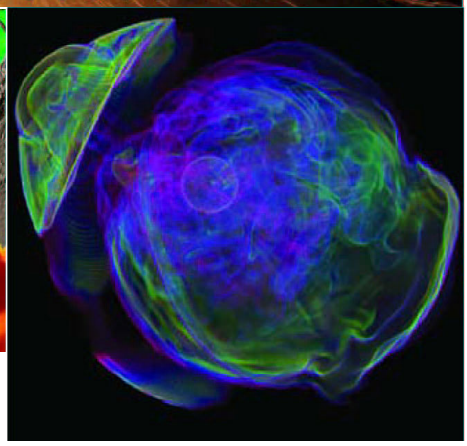


- Restoring, in 2003, the nation's ability to make nuclear weapons through production of the first nuclear weapons pit in 14 years, designed for the W88 warhead aboard the Trident II D5 submarine-launched ballistic missile.
- Discovering the human telomere, a key sequence of DNA base pairs that tells cells when to start and stop molecular replication. This advanced the Human Genome Project, now evolved into a multi-lab partnership known as the Joint Genome Institute, to which Los Alamos contributed the sequencing of chromosome 16.
- Developing the influenza and HIV databases, as well as discoveries of the subtypes of the virus that causes AIDS, the historic origins of the virus in man, and the key characteristics required for influenza vaccines and possible vaccines.
- Producing the KIVA computer code, used for 30 years by every automobile manufacturer in the world to improve the efficiency of the internal combustion engine. The laboratory also developed low-platinum, high-efficiency polymer-membrane fuel cells, now adapted by industry for automotive and energy generation applications.
- Developing high-performance computers, including invention of stored-memory programming in the 1940s and forging industry partnerships that led to development of the first supercomputers.
- Dedicating in 2003 the High Power Detonator Facility to manufacture detonators for the U.S. nuclear stockpile.
- Completion in early 2003 of the second stage of the world's most powerful flash X-ray machine.
- Delivering the first accelerator units for the Spallation Neutron Source project in Oak Ridge, Tenn.
- Construction of an Isotope Production Facility that has restored the nation's ability to make several previously unavailable medical and commercial isotopes.

The laboratory's work in homeland security, nuclear nonproliferation and nuclear safeguards includes the following achievements:

- Inventing and improving dozens of instruments for detecting, measuring and tracking nuclear materials that are used widely by governments, industry and utilities worldwide.
- Developing, with Lawrence Livermore National Laboratory, the Biological Aerosol Sentry and Information System (BASIS) that was used to monitor for pathogens such as anthrax at the Salt Lake City Olympics. This project provided the foundation architecture for the current BioWatch system, deployed nationwide.
- Leading instrument deployment and development efforts for the Department of Homeland Security on a nuclear detection system for the Port Authority of New York/New Jersey.
- Training nuclear material and nuclear safeguards experts, including nearly all of the International Atomic Energy Agency safeguards inspectors for the past 40 years.





- With Sandia National Laboratories, developing and deploying the first nuclear detection satellites through the VELA program beginning in the early 1960s and continuing to the present.
- Analyzing and comparing against Los Alamos-developed databases the various strains of the bacteria causing anthrax for law enforcement.
- Providing the initial outreach to the former Soviet nuclear establishment to implement special nuclear materials protection, control and accountability programs to prevent smuggling and provide alternative work for unpaid nuclear weapons scientists and engineers at the end of the Cold War.
- Finally, an achievement for which the laboratory is perhaps the best known: developing and deploying in less than 18 months the first nuclear weapons that helped end World War II.

Los Alamos National Laboratory is operated by the University of California for the U.S. Department of Energy's National Nuclear Security Administration